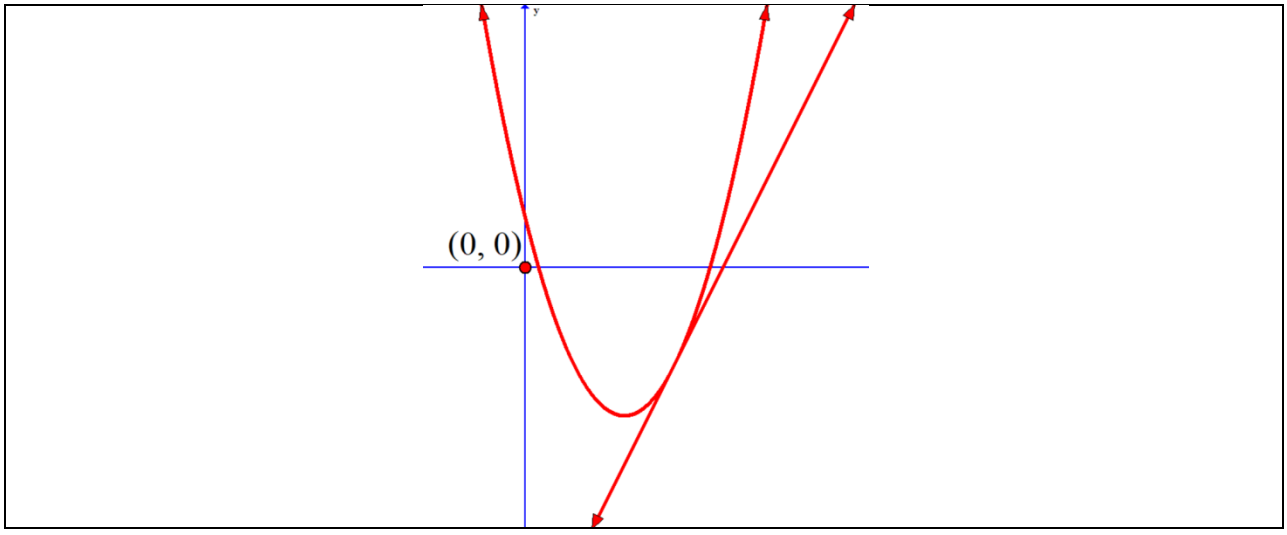
Solving a Linear-Quadratic System Graphically Practice

Use the graph below to answer the first question.

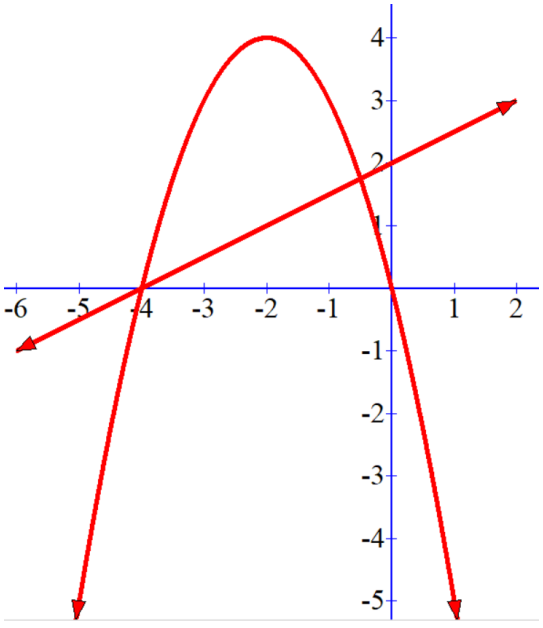


1. A possible solution to the graph shown above is

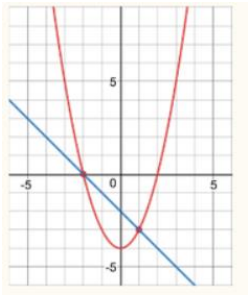
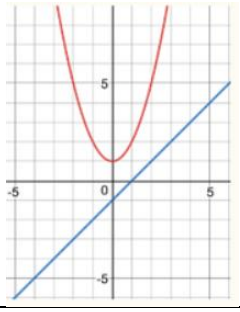
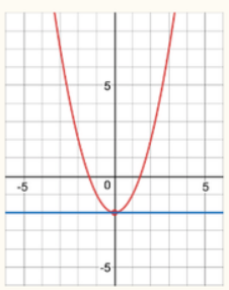
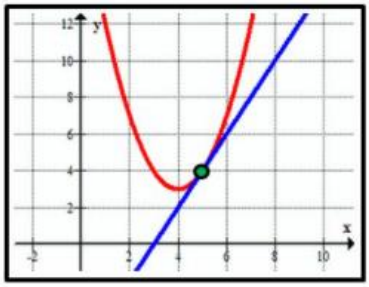
   A) (0, 0) B) (0, 1) C) (3, -2) D) (2, 3)

2. The solution that is also an intercept is

   A) (-0.5, 1.75) B) (-4, 0) C) (0, 2) D) (4, 0)



3. Given the graphs below,

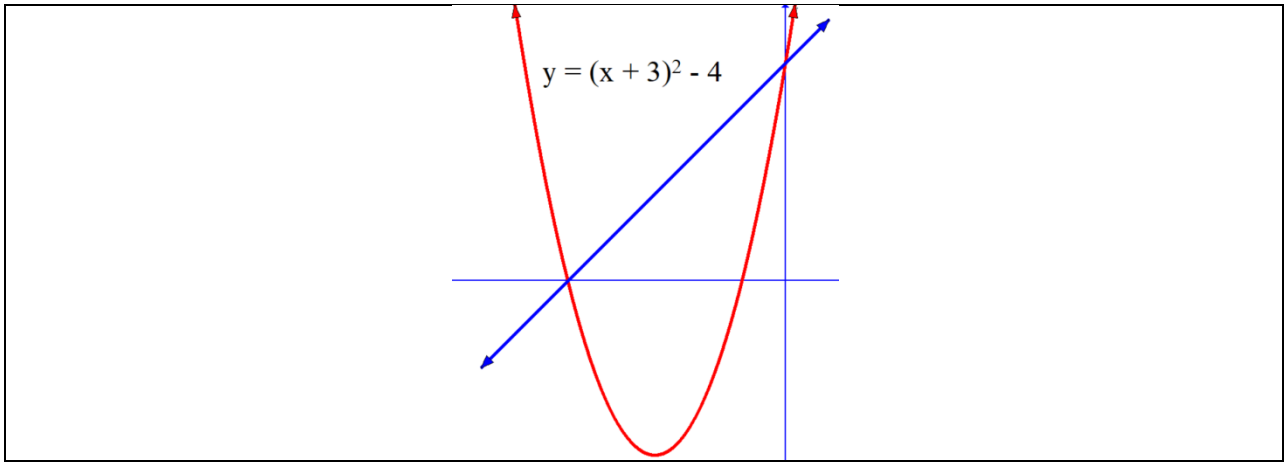
A 	B 
C 	D 

the graph displaying no solution is

A) A B) B C) C D) D

4. Determine the solution(s) to the linear-quadratic system graphically:
$y - 4 = 4x$, and $y = -(x - 0.5)^2 + 6$.

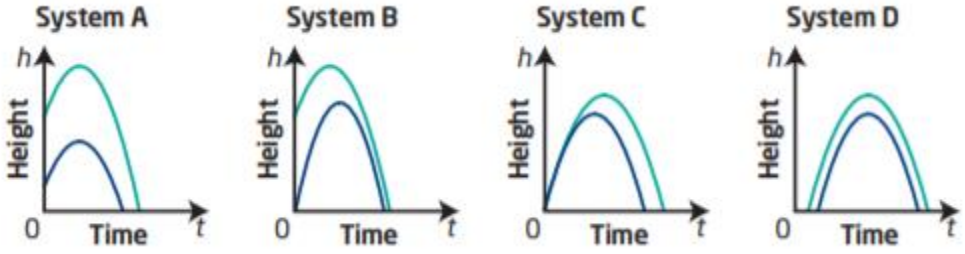
Use the following graph to answer the next question.



5. One solution is on the x-axis and the other solution is on the y-axis. Stated as ordered pairs, the solutions are _____ and _____.

Use the following information to answer the next **two** questions.

Two divers start their dives at the same time. On diver jumps from a 1-m springboard and the other jumps from a 3-m springboard. Their heights above the water are plotted over time.



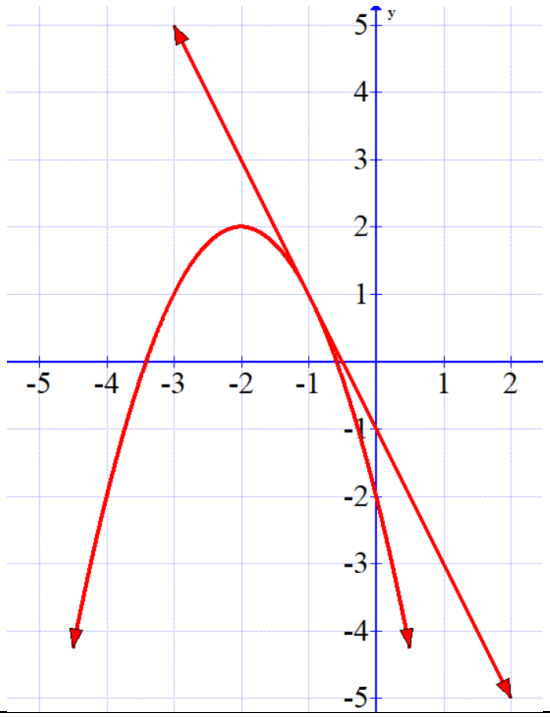
6. Which system could model this scenario?

   A) A B) B C) C D) D

7. Explain why there is no point of intersection for your shown graph.

Use the following information to answer the next question.

The quadratic equation $y = -(x + 2)^2 + 2$ and the linear equation $y = f(x)$ displays one solution in the graph below. The coordinates for the solution are both integers.



8. a) State the solution.

   b) Determine the equation of the linear function $y = f(x)$.

Use the following information to answer the next question.

Consider the following linear-quadratic system:

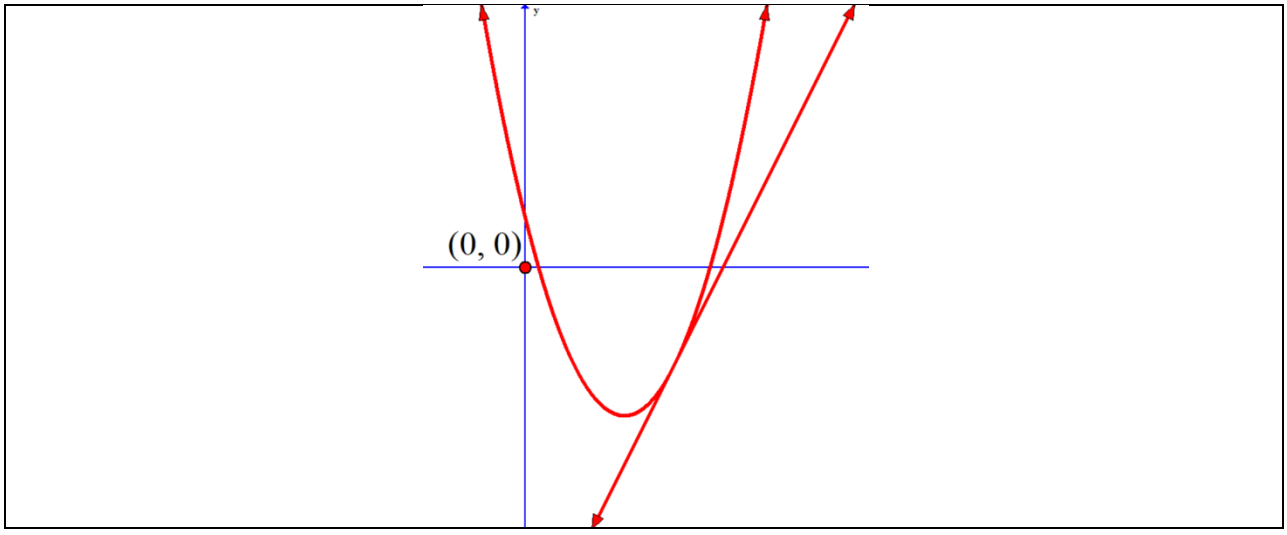
$2x^2 + 20x + y = -40$

$5x + 2y + 26 = 0$

9. When solving the linear-quadratic system graphically, one solution has coordinates that are terminating decimals, and one solution has coordinates that are integers.
   a) Determine both solutions.
   b) Verify the solution that has integer coordinates.

Solving a Linear-Quadratic System Graphically Practice Solutions

Use the graph below to answer the first question.



1. A possible solution to the graph shown above is

   A) (0, 0) B) (0, 1) C) (3, -2) D) (2, 3)

Solution

The intersection point is the solution, and the intersection point in the graph above is in quadrant 4. Coordinates in this quadrant consist of a positive x coordinate and a negative y coordinate. Of the possible choices, (3, -2) is the only one satisfying this criteria.

The correct answer is C.

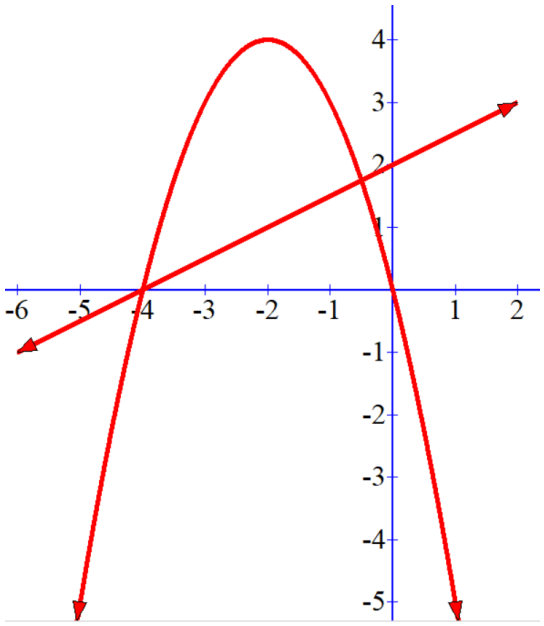
2. The solution that is also an intercept is

   A) (-0.5, 1.75) B) (-4, 0) C) (0, 2) D) (4, 0)

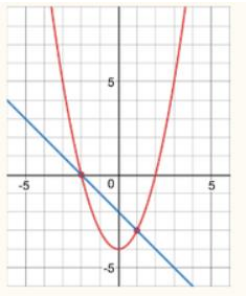
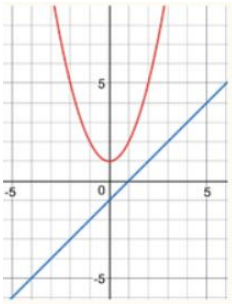
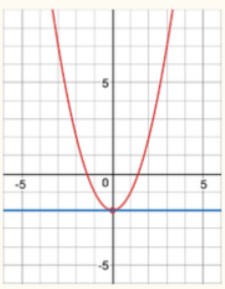
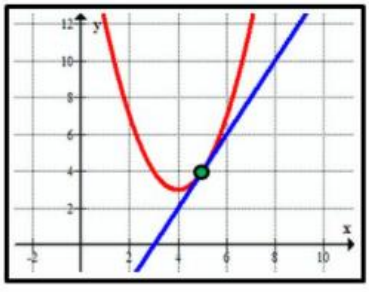
Solution

The graphs intersect at two points; one in quadrant two, at about (-0.5, 1.75) and on the x-intercept at (-4, 0).

The correct answer is B.



3. Given the graphs below,

A 	B 
C 	D 

the graph displaying no solution is

A) A B) B C) C D) D

Solution

Option A has two intersection points, meaning that there are two solutions.

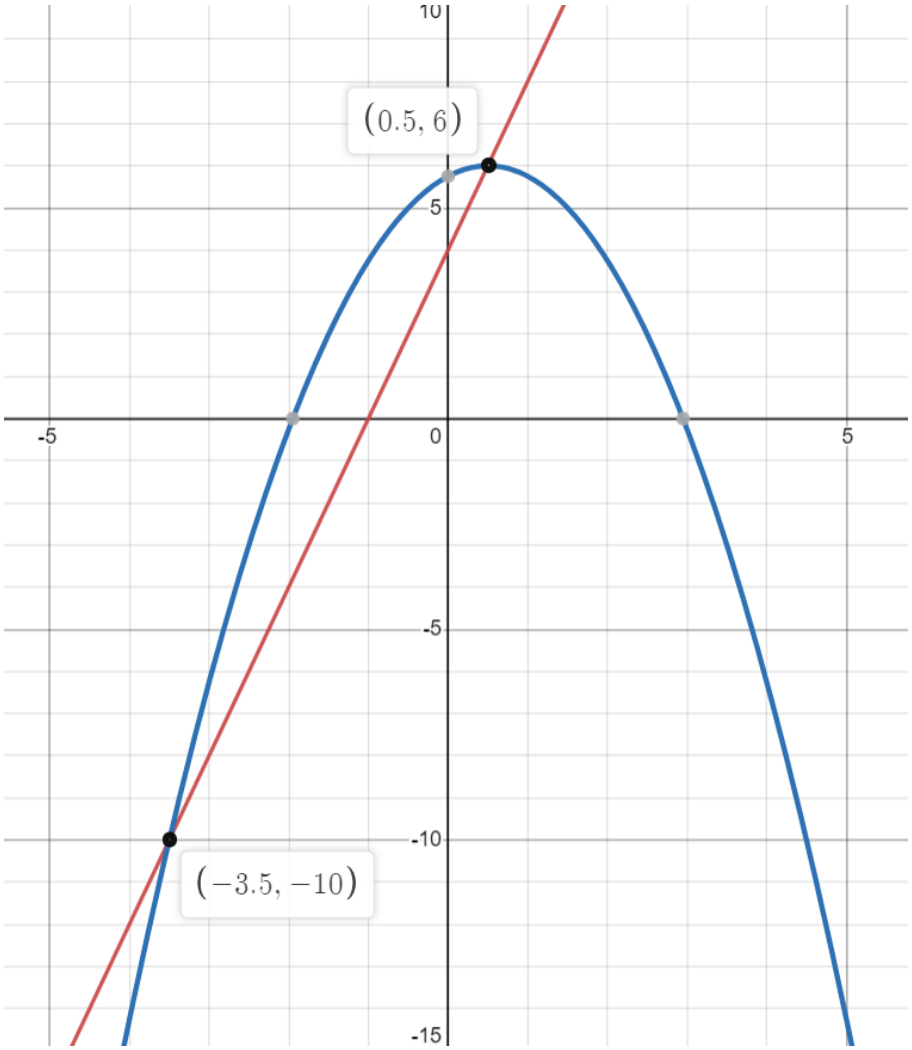
Options C and D both have one intersection point, meaning that there is only one solution.

Option B has no intersection points, meaning that there is no solution.

The correct answer is B.

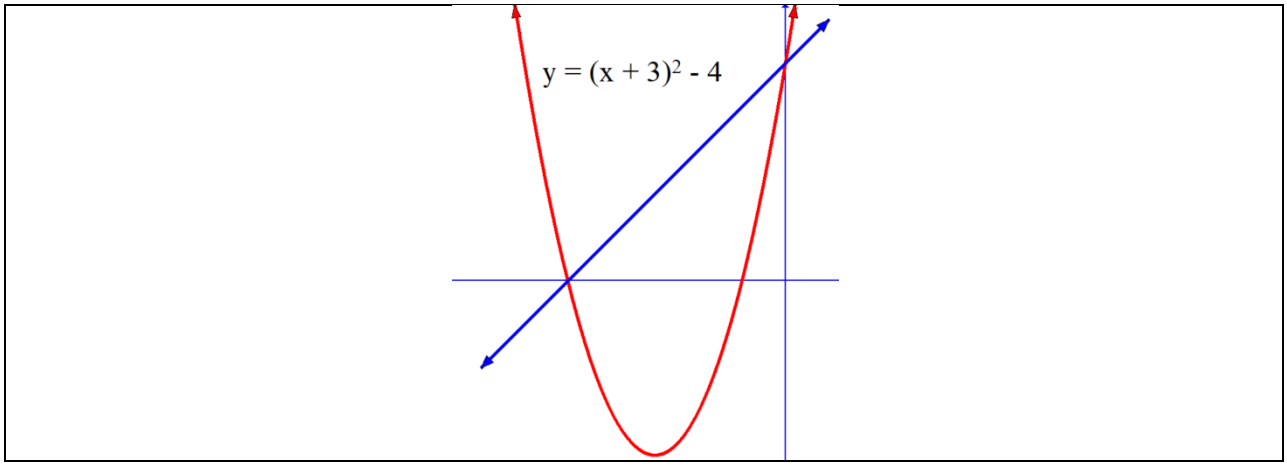
4. Determine the solution(s) to the linear-quadratic system graphically: $y - 4 = 4x$, and $y = -(x - 0.5)^2 + 6$.

Solution Begin by isolating y in the linear equation: $y = 4x + 4$



The solutions are (-3.5, -10) and (0.5, 6).

Use the following graph to answer the next question.



5. One solution is on the x-axis and the other solution is on the y-axis. Stated as ordered pairs, the solutions are _(0, 5)__ and _(-5, 0)__.

Solution

Use the given quadratic equation to find the points on the axes. For the point on the y-axis, substitute x = 0 into the equation.

$y = ((0) + 3)^2 - 4$

$y = 3^2 - 4$

$y = 9 - 4$

$y = 5$

The solution on the y-axis is (0, 5).

For the point on the x-axis, substitute y = 0 into the equation.

$(0) = (x + 3)^2 - 4$

$4 = (x + 3)^2$

$\pm\sqrt{4} = \sqrt{(x+3)^2}$

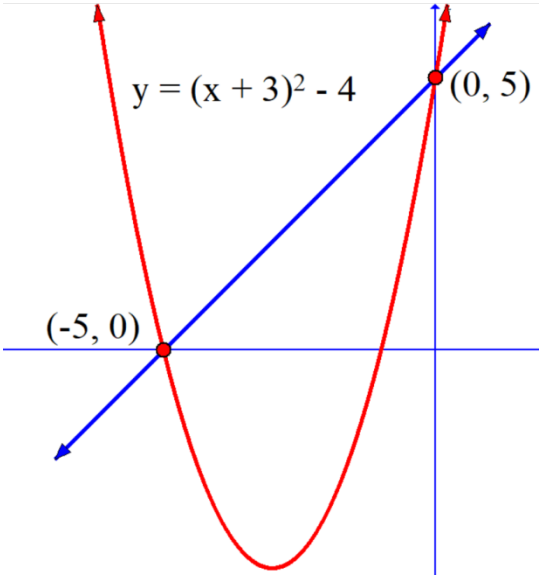
$\pm 2 = x + 3$

$\pm 2 - 3 = x$

$x = 2 - 3$ and $x = -2 - 3$

$x = -1$ and $x = -5$

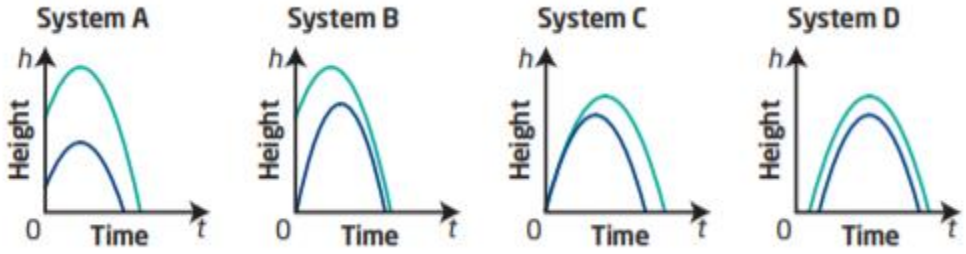
Of the two x-intercepts, the only one intersecting with the linear function is -5.



Stated as ordered pairs, the solutions are _(0, 5)__ and _(-5, 0)__.

Use the following information to answer the next **two** questions.

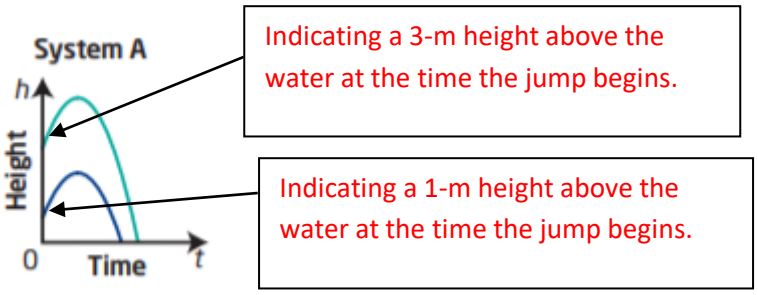
Two divers start their dives at the same time. On diver jumps from a 1-m springboard and the other jumps from a 3-m springboard. Their heights above the water are plotted over time.



6. Which system could model this scenario?

A) A B) B C) C D) D

Solution



Systems B and C have one or both parabolas originating at the origin. This would indicate that there is no springboard at all.

System D has no values on the y-axis. This would mean the parabolas start on the surface of the water, which does not make sense in this context.

The correct answer is A.

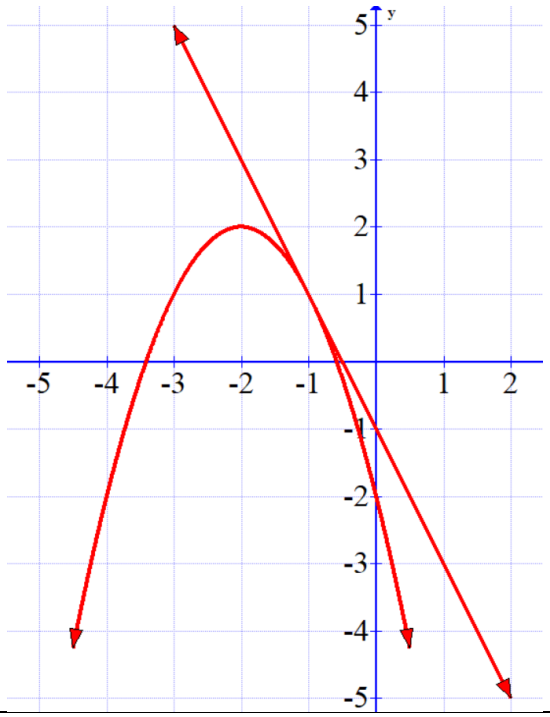
7. Explain why there is no point of intersection for your shown graph.

Solution

There is no point of intersection because the divers are never at the same height at the same time. This is a good thing because they would not want to contact each other.

Use the following information to answer the next question.

The quadratic equation $y = -(x + 2)^2 + 2$ and the linear equation $y = f(x)$ displays one solution in the graph below. The coordinates for the solution are both integers.



8. a) State the solution.
   b) Determine the equation of the linear function $y = f(x)$.

Solution

a) The solution is the intersection point of the two graphs, which is (-1,1).

b) Using the point (-1,1) and the y-intercept of the linear function, (0,-1), the slope can be determined by $\frac{rise}{run}$, or, $\frac{(1)-(-1)}{(-1)-(0)} = -2$. Since the y-intercept is -1, the equation of the linear function $y = f(x)$ is $y = -2x - 1$.

Use the following information to answer the next question.

Consider the following linear-quadratic system:
$2x^2 + 20x + y = -40$
$5x + 2y + 26 = 0$

9. When solving the linear-quadratic system graphically, one solution has coordinates that are terminating decimals, and one solution has coordinates that are integers.
   a) Determine both solutions.
   b) Verify the solution that has integer coordinates.

Solution

a) Isolate y in both equations.

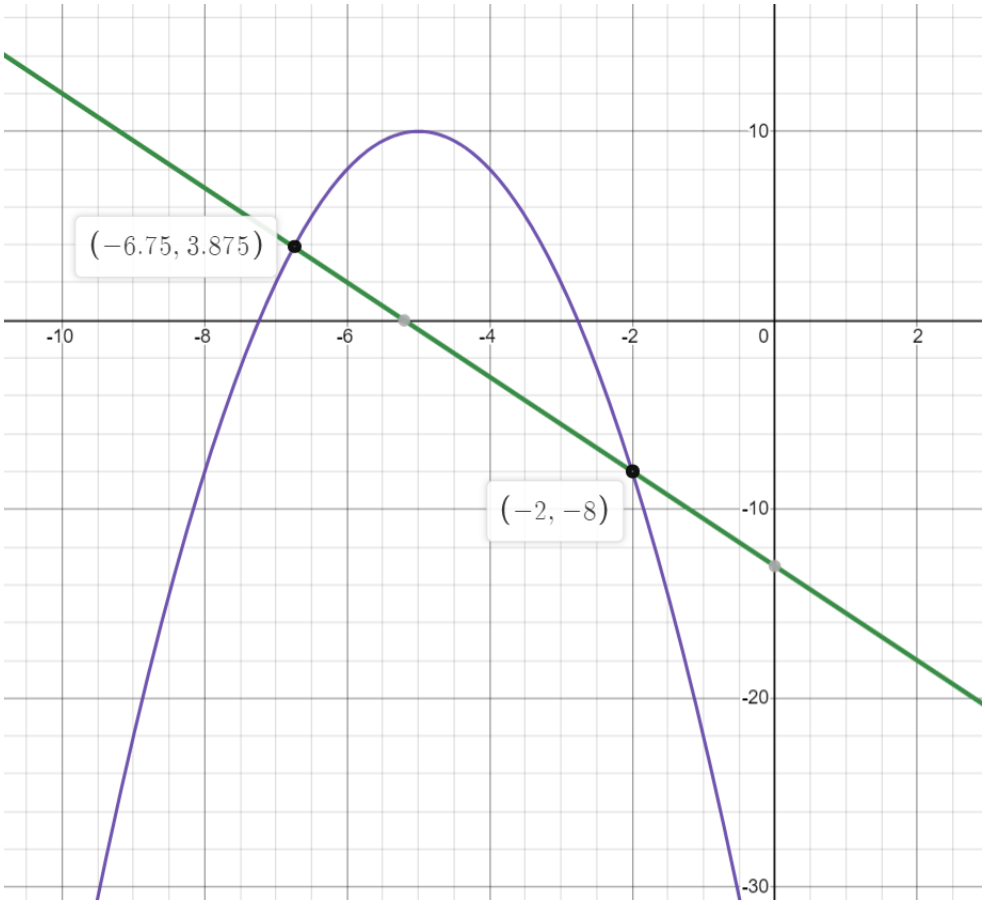
$2x^2 + 20x + y = -40$

$y = -2x^2 - 20x - 40$

$5x + 2y + 26 = 0$

$$y = \frac{(-5x - 26)}{2}$$

Graph the equations and find the points of intersection.



The solutions are (-6.75, 3.875) and (-2, -8).

b) Verify the solution (-2, -8).
Show that the ordered pair satisfies **both** equations.

$2x^2 + 20x + y = -40$		$5x + 2y + 26 = 0$	
$2(-2)^2 + 20(-2) + (-8)$	$= -40$	$5(-2) + 2(-8) + 26$	$= 0$
$8 + -40 + -8$	$= -40$	$-10 + -16 + 26$	$= 0$
-40	$= -40$	0	$= 0$